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Making Things International 1

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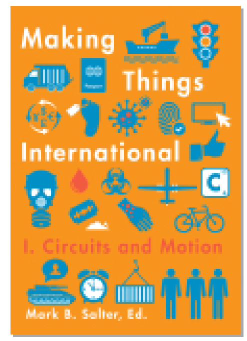

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Containers

Can E. Mutlu

Containers are everywhere. They are stacked on top of each other in ports around the world, used as (temporary) accommodation in American military bases in Afghanistan and Iraq, and recycled to make up a shed in my university's community-gardening center. The intermodal shipping container, or simply container, which is how I will refer to it in this chapter, is a standardized, reusable steel box that ensures safe transportation of cargo freight. The container is designed for efficient and safe shipment of freight across multiple modes of transportation: trucks, trains, and ships. Containers come in different sizes, ranging from the most common twenty-foot-equivalent units (TEU) to units that measure fifty-six feet, depending on the needs of the region and the transportation network. Certain characteristics of the intermodal container, such as stackability and refrigeration, allow for a diversity of goods to be transported internationally at significantly higher volumes than before.

The versatility and the durability of the container are both important for its proliferation, but what makes the container truly an "international object" is its standardization. The standardization of the container is not fully complete; there are regional variations in size, and this undermines the full potential of the container to make international trade more efficient as a whole. But the primary purpose of the standardization process, as dictated by the International Organization for Standardization (ISO), is not to make things uniform in their appearance but rather to standardize their functioning. In other words, what makes a thing international, according to the ISO, is not the size of an object but its function.

The container, in addition to being a standardized object, is also a standard object used to order international trade. When goods are shipped internationally, quotes are issued for TEUs, which in turn are determined by a global container index based in China. The Shanghai Containerized Freight Index determines the price of a TEU based on global supply and demand; the going price for a TEU shipped from Asia to Europe was approximately US$1,500 in April 2014.[1] In international statistics provided by the World Bank, the amount of goods traded internationally is measured in TEUs[2]. In 2010, at the height of the global economic crisis, a total of 103,590,000 containers were shipped between China, the United States, and the European Union.[3] Today, it is estimated that roughly 90 percent of the global trade of nonbulk goods is transported in shipping containers.[4] Global supply chains and the internationalization of production have significantly benefited from the containerization of the global transportation industry. Today, megaships are commissioned by global transportation conglomerates to carry 11,000 TEUs in a single journey; ports and major transportation routes are being changed or further dredged to accommodate such ships.[5] Likewise, industry leaders have started to rethink cargo-port infrastructure and architecture to accommodate such ships and their vast cargo. To that end, port administrators have begun to rely on relevant port (security) technologies designed specifically to process containers quickly in order to avoid building vast storage areas for long-term storage of containers waiting to be cleared through customs.

One term that tries to capture this transformation is *containerization*. Containerization refers to the proliferation of containers as an international standard for global trade, moving away from specialized cargo ships or break-bulk shipping,[6] and the subsequent redevelopment of the transportation grid that includes various modes of vehicles, ports, protocols, practices, and technologies to facilitate the movement of individualized containers. The concept of containerization tries to capture the fact that international trade has increasingly been constructed around the container as a standardized object and to examine what that means for existing, precontainerization structures. The container is used as an object that enables other practices and technologies of international trade and transportation. The standardized container, in that sense, not only "makes things international" through enabling the conditions of possibility for international trade but also enables international trade as a whole, which in turn constitutes a major component of the international in the contemporary meaning of the term used in this volume.

Building on this brief introduction, the next section of this chapter looks at processes of containerization, starting with a reflection on the intermodal shipping container's history and function, and focusing on the significance of standardization on containerization of international trade. The chapter then discusses the intermodal container's role in enabling and transforming international trade by looking at its effect on the international architecture of trade. The final section focuses on the challenges faced by the containerization process: the question of empty containers that result from structural trade deficits between countries such as China and the United States, geological limitations to increased freight volume, and opportunities that stem from the afterlife of containers.

Containerizing the International

Trade is an essential part of the contemporary international. The stability of international trade is dependent on things, standards, and practices that facilitate the movement of goods and services across international borders. The prominent tension within this process is the one between speed and security. The question that occupies border-management professionals is how to make trade simultaneously efficient and secure. The container, as a closed and surveillance-friendly box, has emerged as a possible solution to this problem; given the technologies available to us today, we can easily track a container as it travels across the ocean and monitor its internal air pressure to ensure that its seal remains intact, all while surfing the web. However, the safety of the container is not the only reason we can speak of containerization of the international.

The international standardization of intermodal containers, palettes, railroad gauges, and ships, among other things, creates some of the material conditions for international trade to function. The disposition of these things is central to the ways we move things around and to the possibility of a global exchange economy. At face value, there is nothing appealing about the container; it is just a metal box. The idea behind the intermodal container, however, is an inspirational one: the ability to move freight uninterrupted across various modes of transportation and the establishment of a global standard that is not only efficient but also secure have profoundly changed global transportation practices and have helped shape international trade as we know it today.

Economic globalization refers to a set of complex and interrelated developments in information and communications technologies, relaxed tariff regimes, and interdependent global logistics networks, permitting just-in-time cargo-delivery techniques, producing global production chains. The introduction of intermodal containers made transnational production a profitable option for corporations. Growing cotton in Egypt and producing shirts in Italy, for example, was made much more profitable by reducing transportation costs.

Economic globalization, as a set of practices of interconnectedness and interdependence, requires a functioning global transportation infrastructure. In the last five decades, the container has emerged as a key object within the global transportation sector and has significantly contributed to economic globalization by making trade cheaper, more efficient, and more secure. The container has changed the physical infrastructure of logistics, and the containerization of global trade has forced border-security and customs officials, governments, port authorities, and shipping companies to adapt to this new normal. Containerization has both driven and contributed to the processes of technological innovation.

Containerization, as a process driven by intermodality and standardization, has led to the emergence of the intermodal container as a central object in international trade. I focus on three related issues: debates surrounding the emergence of global standards for intermodal containers, the concept of intermodality and its impact on the way we move things around the world, and the containerization of global transportation practices.

The idea behind transporting goods inside a closed container, rather than in break-bulk, goes back more than two centuries: "The British and French railways tried wooden containers to move household furniture in the late nineteenth century using cranes to transfer the boxes from flat railcars to horse carts."[7] The invention of the modern intermodal container is generally attributed to Malcolm Purcell McLean. McLean was an American trucker-turned-entrepreneur who pursued the idea of intermodal transportation by successfully combining maritime and road transportation for the first time in the 1950s by buying a ship called *Ideal-X*.[8] By using the intermodal container, McLean was able to bridge the administrative and practical differences between maritime and road transportation aboard his ship. This new intermodal route cut shipping costs significantly: "Loading loose cargo [break-bulk] on a medium size ship cost 5.83$ per ton in 1956, [whereas] McLean's experts pegged the cost of loading the *Ideal-X* at 15.8 cents per ton."[9] Although the *Ideal-X*'s journey did not save much on fuel costs, it saved a significant amount of time and money by cutting down costs associated with loading and unloading practices at ports.

Those early days of containerization, however, were plagued by the kind of format war familiar to historians of science: differences in widths, interlocking methods, and internal as well as external specifications generated turbulence within the system. In 1963, the ISO issued its first set of "international standards for containers." These were standards for "10-, 20-, 30-, and 40-foot containers."[10] Standardization requires the proliferation of rules for all aspects of a technology, ranging from the terminology to the identification markers to dimensions to practices for their administration and use. For example, ISO R-668 defined the terminology, dimensions, and ratings of containers;[11] ISO R-79 defined identification markings; and ISO R-1161 made recommendations about corner fittings in order to standardize the practices and processes associated with the containers.[12] Traditionally, the "ISO's practice, wherever possible, was to decide how a product must perform rather than how it should be made."[13] In addition, it was the competition between American, Asian, and European transport companies that undermined the ISO's efforts to harmonize different dimensions for the container. Although the ISO successfully harmonized production standards, quality controls, and security features for the intermodal container, it failed to establish a single standardized size. Differences in infrastructure and demands of the market undermine attempts to create a single container size.

Two major factors determine the demand for different-sized containers and regional preferences. The first is the mode of transportation that comes after the container ship. Global transportation infrastructure varies greatly across different continents. Trains can easily accommodate forty-foot containers, but trucks are less likely to be able to maneuver effectively with such large containers attached. Regional preferences for whether to use trains or trucks determine preferences of regional companies. The exception to this rule is the United States, where trucks with fifty-three-foot containers seem to be the norm rather than the exception; this can be attributed to the interstate highway system, which provides easy navigation for such trucks. The second factor is the market demand. Not every market can sustain forty-foot containers. The demand factor is not simply about the wasted space. As anyone who has used a container to move things around can attest, the container is useful only if you can fill it up completely. Even a small amount of empty space within it can undermine the safety of the whole cargo stored within; loose space allows freight to move around, and this results in (easily preventable) cargo damage. To prevent such mishaps, once again regional companies are forced to take into account different market volumes and demand and to address these factors through different-size containers.

In the long term, these differences in container sizes have proven to be costly for the global transportation industry as a whole. Different standards mean delays at borders and ports and time wasted in moving freight from one kind of container to another. Disagreements over the standardization process delay efforts to further integrate the global transportation grids. As a result of these disagreements, currently we have different regional standards rather than a globally agreed-upon standard for container dimensions. When looked at from the perspective of regional companies that dominate the market, however, even this inefficiency of the system as a whole does not present enough of an incentive to change, for the reasons already explained. Interestingly enough, for the most part, the difficulties associated with this standardization process are due to the land-based modes of transportation and differences in these infrastructures across the regions of the world. The maritime transportation industry has avoided such differences in size mostly because of the safety regulations that are in place. Differences in the standardization process, however, do not spill over into the functioning of the container. In other words, the standards that oversee the intermodality of the container are well developed.

Although the intermodality of the container is what makes the standardization of its dimensions so challenging, it is also what makes it a truly a standardized object. The intermodality of the container refers to its design, which allows for the container to be transferred from one mode of transportation to another. The intermodality of the shipping container transformed transportation practices by bridging the previous divide between the administrative and practical aspects involved in different modes of transportation. This capacity of the container allows a producer in Egypt to pack up a product at its own factory and ship it to the nearest port via truck. At the port, a crane can load the container onto a ship, and within a week that ship can arrive in Rotterdam and be on its way by train to its final destination in France. The intermodal container is central to the way we think about logistics and global production chains.

The intermodality of the container not only led to a dramatic reduction in transportation costs but also changed the way we think about logistics.[14] "Just-in-time" production methods and global production chains have both been made possible as a result of the emergence of the intermodal container as an efficient, reliable, and secure platform. Because of a combination of global standardization and the ease with which a container can be moved from one mode of transportation to another, the conditions of possibility for containerization as a process were met. As I mentioned earlier, the standardization of the container's functions is overseen by the ISO, which ensures that the essential features of the container are universally compatible. Both the standardization and the intermodality of the container contribute to the processes of containerization.

The containerization of global trade has had profound effects. Rather than being delayed at ports or transportation hubs, standardized containers allow for fast, inexpensive, and safe freight forwarding. These three factors are central to the practices and processes of economic globalization. We can assess the impact of containerization from various perspectives. In economic terms, the containerization of global trade has had significant cost-saving consequences. Prior to the intermodal container, "transporting goods was expensive—so expensive that it did not pay to ship many things halfway across the country, much less halfway around the world."[15]

One of the key factors contributing to shipping containers' cost-saving effects is the automation of loading and unloading at ports. Historically, loading and unloading break-bulk cargo was a time-consuming and costly process that required numerous dockworkers to work around the clock. Before cargo began being stored in boxes, dockworkers had to carefully place each item, with not only the safety of the cargo but also the stability of the ship in mind. These days it takes mere hours to unload and reload a sixth-generation container ship with up to 14,500 containers using two state-of-the-art cranes, whereas in the past it took days, even weeks, to load up a cargo ship manually, costing ship owners not only the salaries of dockworkers but also the expense of having a ship waiting to sail. These were all added to the transportation costs of goods being shipped, making global trade a much more costly endeavor.

Reducing the financial costs of international trade comes, in particular, at the expense of those working and living near traditional ports. As containers eliminated the break-bulk practices, the need for dockhands reduced dramatically. Furthermore, the standardization of the container facilitated the development of side technologies, such as container cranes, flatbed trucks, and mobile container scanners, which eliminated the need for a high-volume workforce in ports. The proliferation of containers ravaged the livelihoods of dockworkers, disbanding their once-powerful labor unions and making their profession obsolete. The container as such, then, transformed a whole profession that was once a significant source of employment for thousands of people and the basis of strong unions that were politically active, contributing to the neoliberalization of global economies in multiple ways.

This increased demand for moving thousands of containers every day required the reconfiguration of the existing spatial arrangements of global trade. Such an extensive reconfiguration requires that container ports be built in deep(er) waters, with container-storage areas that can accommodate thousands of containers at once, and that they be connected to transportation grids capable of handling the increasing volume of containers moving in and out of the ports. As a result, where Amsterdam and Liverpool failed, Antwerp, Rotterdam, and Hamburg succeeded. These contemporary transshipment hubs are able to simultaneously accommodate multiple containerships as well as the trains and trucks required to transport their cargo to its final destination in a sustainable way. Similarly, globally we are witnessing a trend of purpose-built container ports located outside of urban centers. The remote location of these ports is, in many ways, enabled by the automation of the port processes that eliminated labor organizations. Similarly, the location of these ports and their distance from urban centers also contribute to the precariousness of working conditions in these ports, and continue the trend of undermining labor. Such ports are being purpose-built in emerging economies such as China, Brazil, and Turkey in order to accommodate their increasing shares in global markets.

Although we cannot attribute economic globalization solely to the intermodal container, the global marketplace as we know it today would not have emerged without the significant reduction of transportation costs associated with the emergence of intermodal containers. Containerization is not the cause of globalization, but it certainly is a condition of its possibility.

The containerization of the international has transformed the global architecture of trade. Experts now think of next-generation container ships when they are planning future ports. The increase in global trade volume, which can partly be attributed to the containerization of trade discussed in this chapter, and the ease with which we can securely move goods around have required this transformation of architecture and infrastructure. Containers not only have reduced the cost of international trade but also have transformed the way we think of logistics. This reconfiguration of the system has not been without resistance. Pressure from corporations, unions, and different regional trade blocs continue to undermine the harmonization of global standards for intermodal containers. This provides certain challenges to the containerization process, but it certainly has not been enough to stop its proliferation. One thing is clear: intermodal containers reduce the cost of international trade, and thus they are here to stay. The limits of the containerization process are not going to be tested by resistance to its implementation. Instead, structural elements such as space and geography will test the limits of containerization.

Containerization Challenges

It seems that when it comes to containers, it is not the sky that constitutes the limit. Instead, it is the bottom of the ocean that is causing a major headache for logistics experts. One of the most profound challenges facing the containerization process is the depth of certain choke points on the global transportation grid. Key passages such as the Suez and Panama Canals and the Malaga and Bosporus Straits are providing yet another structural challenge to the borderless global world myth; these passages are too shallow—and at times too narrow—to accommodate the new generation of mega container ships. Although the current technology allows us to build ships that are much larger than the *Emma Maersk*, the largest container ship at the moment, the geographical limitations of these key choke points limit the potential of the industry. Even the *Emma Maersk* is built with the limitations of these significant passages in mind.[16] Similarly, the depth of international ports is another cause for concern. With dredging operations being costly and paralyzing for ports during the duration of the construction, port managers and ship operators are realizing the material limits of the ideational forces behind containerization processes. Territory, in this sense, is presenting the strongest challenge to the seemingly smooth progress of containerization.

Another challenge comes as a direct result of a certain structural imbalance within the global economy: trade deficits and trade surpluses. For most economists, trade imbalances are numerical problems that refer to the imbalance between imports and exports. If a country imports more than it exports, it ends up with a trade deficit. If it exports more than it imports, then it has a trade surplus. This may seem like a fiscal issue at first, yet, as most port operators on the West Coast of the United States would attest, there is definitely a material side to the trade deficit between the United States and China. China's status as a net exporter to the United States has resulted in the one-way movement of full containers from China to the United States. The problem that stems from this situation is that the United States is left with empty containers. As the United States does not produce enough goods to be exported back to China, storing empty containers in major U.S. ports becomes a major problem; shipping empty containers is both inefficient in cost and unsafe because of the weight imbalance generated by empty containers. Nevertheless, a significant number of empty containers travel back to China to be refilled and reshipped. The ones that are left behind have become a source of inspiration as much as a headache for port managers.

This so-called empty-container problem has led to innovation in the field of architecture. At least some of the empty containers left in ports, or at final destination points, are being refitted to serve as homes in their afterlife. In this process, the standardization that made containers appealing for the transportation field—their durability, integrity, and interlocking systems—has made them appealing for architects who transform them into modern residences. This last point speaks to the significance of the standardization process for the containerization of the international. More so than the durability and the versatility of the container, the standardization of the container contributes to its internationalization.

Notes

1. For more on the Shanghai Containerized Freight Index, see the Shanghai Shipping Exchange website, accessed April 28, 2014, http://en.sse.net.cn/.

2. "Container Port Traffic (TEU: 20 Foot Equivalent Units)," World Bank, accessed April 28, 2014, http://data.worldbank.org/indicator/IS.SHP.GOOD.TU.

3. Ibid.

4. Charles W. Ebeling, "Evolution of a Box," *Invention and Technology* 23, no. 4 (2009): 8–9.

5. Greg Allen, "The Race to Dig Deeper Ports for Bigger Cargo Ships," *National Public Radio,* January 5, 2012, http://www.npr.org/2012/01/05/144737372/the-race-to-dig-deeper-ports-for-bigger-cargo-ships.

6. *Break-bulk* refers to an earlier system of moving cargo around separately rather than in containers. This was the prominent method of transportation prior to the 1950s. See Marc Levinson, *The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger* (Princeton, N.J.: Princeton University Press, 2006).

7. Ibid., 29.

8. Ibid., 36–53.

9. Ibid., 52.

10. Ibid., 138.

11. ISO, "Series 1 Freight Containers—Classification, Dimensions, and Ratings," ISO 668:1995, sec. 1.1, 1995, http://www.iso.org/iso/catalogue_detail?csnumber=24007.

12. ISO, "Series 1 Freight Containers—Corner Fittings—Specification," ISO 1161:1984, sec. 1.1, 1984, http://www.iso.org/iso/catalogue_detail.htm?csnumber=5732.

13. Levinson, *Box,* 137.

14. Brian Slack, "Containerization, Inter-port Competition, and Port Selection," *Maritime Policy and Management* 12, no. 4 (1985): 293–303.

15. Levinson, *Box,* 1.

16. For more information on the *Emma Maersk,* see "*Emma Maersk:* The Largest Container Ship," accessed April 28, 2014, http://www.emma-maersk.com/.